TOP FY 2000
Project Narrative

Baltimore City Health Department

Grant # 24-60-00029
Baltimore, MD

I. Project Purpose

Problem being Addressed - Baltimore City, Maryland, is an industrial port city that faces many challenges to enhancing its quality of life. One of the serious factors in the City's quest for improvement is the control and mitigation of sexually transmitted diseases (STDs), HIV/AIDS, and tuberculosis (TB). Trends showing that these diseases "disproportionately affect ethnically and geographically defined populations…have been extensively documented in Baltimore (JHPHS, 1999). A recent study indicates that Baltimore ranks among the top two cities nationally for incidents of chlamydia, primary and secondary syphilis, and gonorrhea (Center, 1997). The Baltimore City Health Department (BCHD) is the primary agency charged with addressing such concerns. The BCHD operates two STD clinics that handle 30,000 patients annually, and a tuberculosis (TB) clinic. Only 15% of the have billable coverage causing a strain on already limited resources (BCHD, 1999).

The BCHD maintains extensive STD, HIV/AIDS, and TB patient record data at each of the clinics and at a centrally maintained STD Disease Registry (DR). Private health providers and the state Department of Health and Mental Hygiene (DHMH) also submit certain data, as mandated by law, to the STD DR (Code, current). The databases are maintained by legacy systems that were primarily designed to store, and report data. These repositories have inadvertently yielded a comprehensive source of information equity. The Syphilis Registry alone contains records from 50,000 individuals dating back to 1960 (BCHD, 1999). While these systems have succeeded in fulfilling their original mission, there is increasing demand to use this data in more sophisticated ways.

The Johns Hopkins School of Public Health (JHSPH) and BCHD have jointly conducted a Geographic Information Systems (GIS) mapping initiative which demonstrates that incidence of STDs, HIV/AIDs and TB parallel those areas with high incidence of crime (see Appendix B). Medical personnel at the Baltimore City Jail (BCJ) under the Maryland Department of Public Safety and Correctional Services (DPSCS), are required to test arrestees for certain infectious diseases. This is significant considering that over 90,000 arrestees are processed through the Baltimore Region Central Booking intake facility annually, and over 80% of those processed are involved in significant addiction, prostitution, or other high risk behaviors (Swetz, 2000). Duplicative testing and unnecessary treatment often occurs because the BCJ does not have access to medical records and case histories from the BCHD. Conversely, the BCHD does not have electronic access to the infectious disease data reported by the BCJ to the DPSCS to determine when released inmates require further treatment and follow-up.

The areas identified through the GIS mapping initiative also strongly coincide with the boundaries of the Baltimore City Empowerment Zone (BCEZ). An effort currently underway in Baltimore to improve neighborhoods by creating alternative public housing involves the implosion of several existing housing facilities, many of which are located within the BCEZ (Housing, 1999; see Appendix C). An anticipated outcome of these revitalization efforts is a shift in populations within the City which is a concern since these areas have been identified as having concentrations of STDs, HIV/AIDS, and TB. Consequently, there is a need for the mutual sharing of data between the BCHD, JHSPH, DPSCS/BCJ, and BCEZ.

Solution - The proposed solution to address the problem of STDs, HIV/AIDS, and TB in Baltimore is to develop a Multidisciplinary Information Sharing Network (MISN) which would enhance the current capacity for implementing comprehensive and effective solutions. This MISN will first involve compiling the repository of data at the BCHD into a common XML format in order to match and consolidate patient records. The next step will be to provide a dial-in connection for the BCJ to be able to access and send data to the BCHD. This collective data will then be forwarded to the JHSPH via the World Wide Web (WWW), along with that from ongoing BCEZ community health surveys and reports on City housing revitalization efforts, to conduct GIS mapping analysis. The ultimate beneficiaries of the MISN will be the very communities known to be most at risk to STDs, HIV/AIDS, and TB. The following outlines the objectives and anticipated outcomes for successfully achieving this solution (see Appendix D for data flow diagrams).

Objective	Measurable Outcome
1. The BCHD, JHSPH, BCJ, and BCEZ will develop protocols for sharing data	Written protocols specifying data elements and levels of security for sharing data
2. The BCJ will make individual inmate patient records data accessible via a dial-in connection with appropriate levels of security, to BCHD	Decreased number of inmates needing follow-up treatment after release
3. The BCHD will make individual patient case histories data accessible via a dial-in connection, with appropriate levels of security, to BCJ	Decreased number of inmates receiving unnecessary testing and treatment
4. The JHSPH will map BCJ health data obtained via the WWW on inmates diagnosed with early syphilis, gonorrhea and chlamydia	Increased efficiency in tracking inmates for follow-up care upon release
5. The JHSPH will map BCHD aggregate health records obtained via the WWW for the BCEZ	Increased targeted community outreach activities
6. The BCHD will analyze BCEZ quality and accessibility of care survey data obtained via hard copy	Improved quality, environment, and accessibility of health care services
7. The JHSPH will map City revitalization and BCHD disease data obtained via hard copy and the WWW respectively	Increased targeted populations served through improved accessibility

II. Innovation

Technically - In 1997, Sequoia Software Corporation was awarded a grant by the National Institute of Standards and Technology (NIST) to apply an innovative database solution employing Extensible Markup Language (XML) to “develop a Master Patient Index (MPI) that

combines and correlates computerized patient records from different healthcare organizations" (National, 1997). In June 1999, the BCHD signed an agreement with Sequoia to allow the MPI to be used to match patient records between the two STD clinics and the STD DR. The intent of the initiative was to provide a "proof of concept" for how patient records data could be integrated which successfully laid the groundwork to use the XML format more broadly to match a larger number of patient records at the BCHD.

Likewise, a unique "proof of concept" for how data could be applied has been demonstrated through the joint JHU and BCHD GIS mapping initiative that provides a geographical depiction of pertinent disease and crime data. This visual presentation offers a valuable tool for superimposing data from various sources in order to identify areas of concentrated types of occurrences and contributing factors.

Conceptually - Other projects funded under the Technology Opportunities Program have had similar goals in terms of building capacities to share health related data. The San Francisco Department of Public Health AIDS Office was funded to build a centralized client registration system to maintain AIDS-related data. Likewise, the Georgia Division of Public Health received a grant to expand the reach of an Information Network for Public Health Officials (National, 2000). However, the concept of exchanging data across disciplines via a MISN as a basis for establishing a community health model that targets specific populations appears to be unique. While this broad based approach for sharing data between disciplines has been widely used in public safety through community and problem solving policing, it has not been commonly applied to public health.

III. Diffusion Potential

The proposed project lends itself to universal replication because other communities can identify with the problem, approach, solution, and application offered in this project. STDs, HIV/AIDS, and TB are a nationwide problem, particularly in those areas with concentrated populations. Furthermore, the issue of disparities in health and access to care continues to be huge problem despite progress in the health of the nation as a whole. This is particularly true in those areas that tend to have disproportionately higher numbers of minorities, as is found in most Empowerment Zones (Housing, 2000). A recent national study also shows that inmates have disproportionately higher rates of STD and TB than general populations (Health, 1999). A summary of this study states that, "collaborations in discharge planning and transitional services for those being released were absent from most facility's HIV/AIDS programs…to increase the number and success of STD programs for incarcerated patients, collaborative efforts must be strengthened…" (National, 1999).

Consequently, the approach of sharing information across disciplines in order to provide targeted health care is much needed and the stated outcome to formalize protocols for security and sharing data elements is also transferable. The solution of sharing data via an XML format has enormous potential because it allows databases with differing characteristics in different environments to be integrated. In his kickoff speech at the recent Comdex conference in Las Vegas, Microsoft's Bill Gates touted XML as cutting edge technology that will be broadly applied in the future (Kalish, 1999).

Meanwhile, the application for data analysis through visual tools such as GIS mapping offers a way to link many sources of data, including housing and crime data, to disease data. This is relevant because cities nationwide are attempting to revitalize their downtrodden neighborhoods by improving and shifting public housing facilities. Every time these shifts occur, health departments will be faced with tracking their clients for treatment and follow-up. Similarly, when infected inmates are released back into the general populations, there will be a similar dilemma.

IV. Project Feasibility

Technical Approach – The technical approach for sharing data will be to utilize 1) XML as a means of converting data into similar formats; 2) a dial-in connection, the WWW, and a T-1 line as a means of transferring data electronically; and, 3) the GIS mapping initiative as a means of analyzing data. It will also involve the development of written protocols which specify which data elements should be shared between partner agencies and what the levels of security should be for determining who can access which of those elements.

Interoperability- Data records from the TB, two STD clinic, and STD DR databases of the BCHD will be transferred to a centralized database via XML to a secured web site. Then, they will be electronically matched by expanding the algorithms previously used to match records between the two STD clinic databases as part of the XML "Proof of Concept" initiative. These database specifications are as follows:

Name of System	Database Platform	Network Operating System
BCHD DR	Access	Novell NetWare
BCHD Druid and Eastern STD Clinic Databases	Customized Clipper files (database like)	Novell NetWare, connected to each other by T-1 line
BCHD TB Database	Oracle	Novell NetWare, converting to Microsoft NT
BCHD Isolated Centralized Databases	FoxPro, Oracle, Dbase, others	Novell NetWare, converting to NT

Once the patient records maintained in these databases are consolidated, data will be transferred electronically between a centralized database at the BCHD and the BCJ through a dial-in connection. This data will also be forwarded to the JHSPH for conducting GIS mapping analysis through the WWW (see Appendix E for diagram).

Technical Alternatives – Since the BCJ does not currently maintain a database of inmate health records, providing a dial-in connection between the BCHD and the BCJ would provide a secured environment for the transfer of data without requiring the BCJ to maintain a separate database. However, should the BCJ determine a need to maintain a separate database, alternatives such as batch updating or transferring data through the WWW are potential solutions.

Scalability – XML is an ideal mechanism to exchange records between repositories of data because it has the capacity to interface with an array of software and hardware environments, including those associated with these databases. Similarly, data can be imported into the GIS mapping tool in a variety of formats in order to superimpose many "layers" of data from different sources as a basis for drawing correlations. Finally, written protocols for guiding the data sharing process can be adapted, with minor tweaking, by other partners as well. Consequently, it is anticipated that the project scope will be expanded to include other divisions within the MD DPSCS such as the juvenile justice and other statewide adult correctional facilities, as well as the school and housing authorities.

Maintaining System - The BCHD and BCJ already have resources in place for maintaining existing databases, and will have added incentive to continue maintaining the integrated network because it will ease their burden in fulfilling legislative mandates for collecting and reporting data. Other project partners will also have an interest in the system upkeep because of the benefit derived from the resulting GIS mapping analysis to improve services for targeted populations. Applicant Qualifications - Some examples of relevant accomplishments include: the XML proof of concept to match patient records between the two STD clinics; the GIS mapping initiative with JHPHS; the community needs assessment project "Talk to Me" conducted with CDC; and, the implementation of a state-of-the-art-video conferencing training center. All of this is in addition to administering numerous grant programs, providing direct health services, and maintaining extensive data repositories.

The proposed Project Manager, Jerry Huffman (BCHD MIS Director), has extensive experience in managing information systems, particularly with the health services field. Other key positions include: Dr. Jonathan Zimmerman, Principle Investigator, who coordinated the aforementioned GIS mapping initiative for JHPHS; and, Dr. Anthony Swetz, MDPSCS, BCJ Director of Inmate Medical Services (see Appendix F for details). Volunteer Citizen Health Advocates based at the BCEZ Village Centers will also work with community organizations representing surrounding neighborhoods to facilitate outreach efforts and solicit feedback from residents.

This project will be implemented under the guidance of a Steering Committee to be staffed by these individuals. An outside contractor with appropriate networking skills and experience, will be selected through a competitive process. Qualifications of the proposed project evaluation team are addressed under the "Evaluation and Documentation" section.

Budget - A budget summary is as follows:

Category	**Funds**		
	Federal	Matching	Total
Personnel	$0	$238,000	$238,000
Fringe Benefits	$0	$71,400	$71,400
Travel	$2,052	$0	$2,052
Equipment	$0	$27,000	$27,000
Supplies	$0	$500	$500
Contractual	$530,011	$215,162	$745,173
Other	$20,000	$0	$20,000
Indirect Charges	$0	$0	$0
Total:	$552,063	$552,062	$1,104,125

Implementation Timeline - It is estimated that the entire project from start-up to evaluation would take a period of 36 months. A timeline for specific tasks is as follows:

Establishment of Steering Committee and Project Start-up: 1st month
Specification of Contractor Requirements: 2nd month
Selection of a Contractor: 3rd-4th month
Identification of MIS Output Requirements: 5th-6th month
Development of Protocols for Sharing Data: 7th-8th month
Assessment of Physical and Software Environments: 9th-11th month
Design of System Integration: 12th-13th month
Development of Secured Data Transfer Web Site: 14th-18th month
Conversion of Individual Database Records: 19th-21th month
Expansion of Matching Algorithim: 22th-24th month
Alpha Testing of System Integration: 25th month
Beta Testing of System Integration: 26th month
Installation Testing of System Integration: 27th month
Development of Dial-in Connection between BCJ and BCHD: 28th-29th month
Training in Integrated System: 30th month
Mapping of MIS Outputs: 29th-32th month
Analysis of MIS Outputs: 33th-36nd month
Recommendations for Community Outreach Initiatives: 36th month
Quality Assurance and Evaluation of Project – 1st-36th month

Sustainability - The fact that there is already an infrastructure in place in terms of Village Centers, Citizen Health Advocates, and community and private partnerships within the BCEZ, will facilitate the sustainability of the goals implemented under this project. This is particularly true since one of the seven stated BCEZ priorities is "Health and Family Development" (Empower, 1998). There are also more comprehensive automation and integration efforts underway at the BCHD of which this project would be one part. Finally, one of the primary project partners, the BCJ, is housed under the MD DPSCS which also administers other adult and juvenile correctional facilities statewide that are similarly required to report health data. Consequently, there is not only commitment to this initiative at the local level, but at the state level as well (see Appendix G: Letters of Commitment and Statement of Matching Funds).

V. Community Involvement

Project Partners - Collectively, the partners will benefit from this project by using the analysis resulting from the MISN as a basis for implementing outreach initiatives. Individually, these partners will have a stake in the project as follows (see Budget Narrative for budget details and Appendix G: Letters of Commitment and Statement of Matching Funds):

- The BCHD will provide cash match via a Project Manager and Systems Analyst.
- The JHSPH will provide cash match via a Principle Investigator and Mapping Analyst.
- The volunteer Citizen Health Advocates of the BCEZ will provide in-kind services coordinated through the Empower Baltimore Management Corporation.
- The MD DPSCS, BCJ will provide cash match via a Director of Inmate Services and Systems Analyst.

Involvement of the Community - In 1997, the BCHD and CDC conducted a "Talk to Me" survey of Baltimore residents and service providers to determine perceptions regarding community health care needs. The general feedback was that services should be more universally accessible in terms of costs, location, and hours. In response to the question of what the "Ideal STD Program" should include, service providers answered, "coordination and partnership" and a "comprehensive" approach with support from state and local government and private leaders (BCHD, 1999).

Although the end users of the technology outlined in this proposal will be the partner agencies, the primary beneficiaries will be the citizens of Baltimore City, particularly those in the BCEZ. Citizen Health Advocates from BCEZ Village Centers will solicit feedback from the residents and act as community liaisons in implementing recommended outreach efforts.

VI. Reducing Disparities

Disparities - The national shift away from industry toward a service economy over the past few decades has had a tremendous affect on employment opportunities in the inner cities. This has occurred in Baltimore where suburban flight has persisted resulting in a steady decline in population over the past few years. A majority of those remaining in Baltimore have incomes below the official poverty line (BCHD and CDC, 1999). As with many other older cities where this has occurred, a relatively weak tax base exists despite vigorous efforts to revitalize the city.

Consequently, health concerns have to compete with other priorities such as public safety and infrastructure maintenance. Unfortunately, “despite recent progress in the overall health of the Nation, there are continuing disparities in the incidence of illness and death” (Housing, 2000). The three clinics that the BCHD operates are in two locations that provide services for the entire city. Since a vast majority of the patients of these clinics do not have insurance, health services are that much less attainable.

Overcoming Barriers - One of the needs identified through the “Talk to Me” survey is to reduce the disparity in access to health care. The MISN between the BCJ, BCEZ, and BCHD and GIS mapping will assist in locating and tracking individuals in need of follow-up. This in turn, will facilitate more timely treatment. GIS mapping of data will also provide information about strategic locations to establish additional health facilities. Finally, continual feedback about resident perceptions regarding the quality and accessibility of health care will be solicited by the Citizen Health Advocates.

VII. Evaluation and Documentation

Evaluation Strategy and Analysis - Moving from “what is expected” to “what actually occurred” is a process that can be determined by both process and impact evaluations. Process evaluation focuses on how a program was implemented and how it operates by identifying the procedures undertaken and the decisions made in developing the program. Impact evaluation focuses on the broad, long-term impacts of program activities. This evaluation will encompass both process and impact assessments. The questions to be answered directly correspond with the “Measurable Outcomes” outlined in Section I. The “Evaluation Template in Appendix H specifies the corresponding objectives, questions to be answered and whether they are process or impact related, and the source of data.

A Quantified Program Assessment (QPA) will be the methodology used to analyze the data. QPA provides a way to describe and measure various types performance indicators using these components: the development of primary and secondary performance indicators; the assignment of numerical values on a five-point scale; the assignment of weights for indicators to reflect their relative importance; and, the calculation of goal attainment scores (see Appendix I for explanation of methodology).

Evaluation Resources – It is desirable to have an external team conduct the evaluation and training, particularly since so many partners are involved, to ensure objectivity. Consequently, LOCUS, a provider currently under contract with the BCHD to work on grants, is proposed to conduct the project evaluation in data sharing protocols. LOCUS’ stated mission is to conduct targeted analysis resulting in tangible, comprehensive solutions as a basis for effective program development. Integral to this mission is program evaluations. The evaluation team would include: Jerry M. Hatfield, Evaluation Coordinator, with over 30 years of experience in program planning and evaluation; Laura Burke, Quality Assurance Liaison, with an extensive background in program development and systems testing; and, Cara H. Pianka, Research Associate. As per the Budget Narrative, 7% of the overall budget is allocated for project evaluation.

Appendix A: Key of Acronyms

Baltimore City Health Department (BCHD)
Baltimore City Jail (BCJ)
Bureau of Justice Assistance (BJA)
Center for Disease Control (CDC)
Empowerment Zone (EZ)
Extensible Markup Language (XML)
Housing Authority of Baltimore City (HABC)
Johns Hopkins School of Public Health (JHSPH)
Maryland Department of Mental Health and Hygiene (MD DMHH)
Maryland Department of Public Safety and Correctional Services (MD DPSCS)
Master Patient Index (MPI)
Multidisciplinary Information System Network (MISN)
National Institute of Justice (NIJ)
National Institute of Standards and Technology (NIST)
Primary Performance Indicators (PPIs)
Secondary Performance Indicators (SPIs)
Sexually Transmitted Diseases (STDs)
Tuberculosis (TB)
World Wide Web (WWW)